

Example 6 described herein incorporates a maltodextrin chemical within the alginate foam composition having a dextrose equivalent of 13.0 - 17.0. It is clear that other maltodextrins having dextrose equivalents other than 13.0 - 17.0 such as those which are available having dextrose equivalents of 4.0 - 7.0 and 16.5 - 19.5, may be utilized within the scope of the invention described herein without deviating from the novelty of the invention herein described.

The above descriptions and examples illustrate particular constructions including the preferred embodiments of the solutions. However, the invention is not limited to the precise constructions described herein, but, rather, all modifications and improvements thereof encompassed within the scope of the invention.

I claim:

1. A process for making a water-insoluble alginate sponge or foam product to be utilized in the preparation of wound dressings or surgical products comprising the steps of:
  - (I) making an aqueous solution of a water soluble alginate composition;
  - (II) while allowing the total composition of (I) to be mixed, adding a di- or trivalent cation metal ion salt capable of complexing the water-soluble alginate to form water-insoluble alginate hydrogels;
  - (III) adding into the mixture (II) a gaseous foam-forming or effervescent compound(s) and a water-soluble acid and,
  - (IV) introducing into the alginate composition the components sodium tetraborate and ammonium hydroxide;
  - (V) pouring said composite mixture onto a fibrous cloth contained in a tray or dish which fibrous cloth will become affixed to the alginate composition after the water component of the mixture has evaporated.

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2. The process of claim 1 wherein said water-soluble alginate is selected from a group consisting of ammonium, magnesium, potassium, and sodium salts of alginate or mixtures thereof.
  3. The process of claim 1 wherein said polyvalent cation is selected from a metal ion derived from salts selected from the group consisting of alkaline earth metal salts, alkali metal salts, transition metal salts, and mixtures thereof.
  4. The process of claim 1 wherein said cation is selected from the group consisting of calcium, barium, copper, magnesium, iron, zinc, aluminum, manganese, silver, strontium, and mixtures thereof.
  5. The process of claim 1 wherein the said effervescent compound is selected from group consisting of the alkali metal carbonates.
  6. The process of claim 5 wherein said effervescent compound is sodium carbonate.
  7. The process of claim 5 wherein said effervescent compound is sodium bicarbonate.
  8. The process of claim 1 wherein said water-soluble acid is selected from the group consisting of acetic, lactic, malic, gluconic, hydrochloric, and ascorbic acids.
  9. The process of claim 1 wherein a medicament is added to the alginate foam composition.
  10. The process of claim 9 wherein said medicament is selected from the group consisting of collagen, maltodextrin, antibiotics, antibacterial agents, anti-inflammatory agents, ascorbic acid, amino acids, and mixtures thereof.
  11. The process of claim 1 wherein a hydrophilic polymer is added to the alginate foam composition.
  12. The process of claim 11 wherein the hydrophilic agent is a sodium polyacrylate polymer.

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13. The process of claim 1 wherein a plasticizer is added to the foam composition.
  14. The process of claim 13 wherein said plasticizer is selected from a group consisting of glycerin, propylene glycol, ethylene glycol, polyethylene glycol or mixtures thereof.
  15. The process of claim 1 wherein a surface active agent is added to the alginate foam composition.
  16. The process of claim 15 wherein said surface active agent is selected from a group consisting of polyoxyethylene sorbitan monolaurate, polyoxyethylene sorbitan monopalmitate, polyoxyethylene sorbitan monooleate, polyoxyethylene sorbitan trioleate, polyoxyethylene-polyoxypropylene block polymer, or a mixture thereof.
  17. The process of claim 1 wherein the di- or trivalent cation metal salt complexing the water soluble alginate is calcium sulphate.
  18. The process of claim 1 wherein the di- or trivalent cation metal salt complexing the water soluble alginate is calcium chloride.
  19. The process of claim 1 wherein said fibrous cloth is selected from cloths prepared from cotton, polyester, wool, nylon, rayon or mixtures thereof.
  20. A process for making a water-insoluble alginate sponge or foam product to be utilized in the preparation of wound dressings or surgical products comprising the steps of:
    - (I) making an aqueous solution of a water soluble alginate composition;
    - (II) while allowing the total composition of (I) to be mixed, adding a di- or trivalent cation metal ion salt capable of complexing the water-soluble alginate to form water-insoluble alginate hydrogels;
    - (III) introducing into the alginate composition the components sodium tetraborate and ammonium hydroxide;
    - (IV) while continuing to mix the entire composition, introducing a gas into the alginate composition;

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(V) pouring said composite mixture onto a fibrous cloth contained in a tray or dish which fibrous cloth will become affixed to the alginate composition after the water component of the mixture has evaporated.

21. The process of claim 20 where said gas producing the foam is selected from a group consisting of nitrogen, carbon dioxide, argon, neon, or mixtures thereof.

22. The process of claim 20 in which the fibrous cloth is selected from cloths prepared from cotton, polyester, wool, nylon, rayon or mixtures thereof.

23. The process of claim 20 wherein said water-soluble alginate is selected from a group consisting of ammonium, magnesium, potassium, and sodium salts of alginate or mixtures thereof.

24. The process of claim 20 wherein said polyvalent cation is selected from a metal ion derived from salts selected from the group consisting of alkaline earth metal salts, alkali metal salts, transition metal salts, and mixtures thereof.

25. The process of claim 20 wherein said metal cation is selected from the group consisting of calcium, barium, copper, magnesium, iron, zinc, aluminum, manganese, silver, strontium, and mixtures thereof.

26. The process of claim 20 wherein a medicament is added to the alginate foam composition.

27. The process of claim 26 wherein said medicament is selected from the group consisting of collagen, maltodextrin, antibiotics, antibacterial agents, anti-inflammatory agents, ascorbic acid, amino acids, and mixtures thereof.

28. The process of claim 20 wherein a hydrophilic agent is added to the alginate foam composition.

29. The process of claim 28 wherein the hydrophilic agent is a sodium acrylate polymer.

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30. The process of claim 20 wherein a plasticizer is added to the foam composition.

31. The process of claim 30 wherein said plasticizer is selected from a group consisting of glycerin, propylene glycol, ethylene glycol, and polyethylene glycol or mixtures thereof.

32. The process of claim 20 wherein a surface active agent is added to the alginate foam composition.

33. The process of claim 32 wherein said surface active agent is selected from a group consisting of polyoxyethylene sorbitan monolaurate, polyoxyethylene sorbitan monopalmitate, polyoxyethylene sorbitan monooleate, polyoxyethylene sorbitan trioleate, polyoxyethylene-polyoxypropylene block polymer, or a mixture thereof.

34. The process of claim 20 wherein the di- or trivalent cation metal salt complexing the water soluble alginate is calcium sulphate.

35. The process of claim 20 wherein the di- or trivalent cation metal salt complexing the water soluble alginate is calcium chloride.

36. A process for making a water-insoluble alginate sponge or foam product to be utilized in the preparation of wound dressings or surgical products comprising the steps of:

(I) making an aqueous solution of a water soluble alginate composition;

(II) while allowing the total composition of (I) to be mixed, adding a di- or trivalent cation metal salt capable of complexing the water-soluble alginate to form water-insoluble alginate hydrogels;

(III) adding into the mixture (II) a gaseous foam-forming or effervescent compound(s) and a water-soluble acid and,

(IV) introducing into the stirred alginate foam composition a hydrophilic polymer, sodium tetraborate, and ammonium hydroxide,

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Wt Suspension*

- (V) sterilizing the water-insoluble alginate sponge or foam preparation as prepared above and adding aseptically to it a viable cell suspension, and,
- (VI) aseptically pouring said composite mixture into a dish or tray which is permitted to stand until the water component of the mixture has evaporated.

37. The process of claim 36 in which the composite mixture is aseptically poured onto a fibrous cloth contained in a dish or tray, which fibrous cloth will become affixed to the alginate composition after the water component of the mixture has evaporated.

38. The process of claim 37 wherein said fibrous cloth is selected from cloths prepared from cotton, polyester, wool, nylon, rayon or mixtures thereof.

39. The process of claim 36 wherein said water-soluble alginate is selected from a group consisting of ammonium, magnesium, potassium, and sodium salts of alginate or mixtures thereof.

40. The process of claim 36 wherein said polyvalent cation is selected from a metal ion derived from salts selected from the group consisting of alkaline earth metal salts, alkali metal salts, transition metal salts, and mixtures thereof.

41. The process of claim 36 wherein said cation is selected from the group consisting of calcium, barium, copper, magnesium, iron, zinc, aluminum, manganese, silver, strontium, and mixtures thereof.

42. The process of claim 36 wherein the effervescent compound is selected from a group consisting of the alkali metal carbonates.

43. The process of claim 42 wherein said effervescent compound is sodium carbonate.

44. The process of claim 42 wherein said effervescent compound is sodium bicarbonate.

45. The process of claim 36 wherein said water-soluble acid is selected from the group consisting of acetic, lactic, malic, gluconic, hydrochloric, and ascorbic acids.

46. The process of claim 36 wherein a medicament is added to the alginate foam composition.

47. The process of claim 46 wherein said medicament is selected from the group consisting of collagen, maltodextrin, antibiotics, antibacterial agents, anti-inflammatory agents, ascorbic acid, amino acids, and mixtures thereof.

48. The process of claim 36 wherein the di- or trivalent cation metal salt complexing the water soluble alginate is calcium sulphate.

49. The process of claim 36 wherein the di- or trivalent cation metal salt complexing the water soluble alginate is calcium chloride.

50. The process of claim 36 wherein said plasticizer is selected from a group consisting of glycerin, propylene glycol, ethylene glycol, and polyethylene glycol or mixtures thereof.

51. The process of claim 36 wherein said surface active agent is selected from a group consisting of polyoxyethylene sorbitan monolaurate, polyoxyethylene sorbitan monopalmitate, polyoxyethylene sorbitan monooleate, polyoxyethylene sorbitan trioleate, polyoxyethylene-polyoxypropylene block polymer, or a mixture thereof..

52. The process of claim 36 wherein the hydrophilic polymer is a sodium polyacrylate polymer.

53. The process of claim 36 wherein the water component of the mixture is evaporated, by drying in an oven at a temperature not to exceed 70 degrees centigrade.

54. The process of claim 36 wherein the water component of the mixture is evaporated at room temperature.